Activation of Dendritic Cell Function by Soypeptide Lunasin as a Novel Vaccine Adjuvant

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The innate immune system is the first line of defense against intruding pathogens. Dendritic cells (DCs) act as messengers between the adaptive and innate immune system, which process and present antigens to mature T helper cells (CD4+T), and Cytotoxic T cells (CD8+T). The addition of an appropriate adjuvant that activates the innate immunity is essential to subsequent development of the adaptive immunity specific to the vaccine antigens. Thus, any innovation capable of improving the immune responses may lead to a more efficacious vaccine. We recently identified a novel immune modulator using a naturally occurring seed peptide called lunasin. Lunasin was originally isolated from soybeans, and it is a small peptide containing 43 amino acids. Our studies had revealed stimulatory effects of lunasin on innate immune cells by regulating expression of a number of genes that are important for immune responses. The objective was to define the effectiveness of lunasin as an adjuvant that enhances immune responses. Immunization of mice with ovalbumin (OVA) and lunasin inhibited the growth of OVA-expressing A20 B-lymphomas, which was correlated with OVA-specific CD8+ T cells. Increased levels of anti-OVA IgG were also observed in mice immunized with OVA and lunasin. These results suggest that lunasin may function as a vaccine adjuvant by promoting DC maturation, which in turn enhances the development of protective immune responses to the vaccine antigens.

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